UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/702,646	11/07/2003	Tetsuro Tojo	244779US3	3064

22850 7590 12/30/2010

OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, L.L.P.
1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER	
DINH, BACH T	

ART UNIT	PAPER NUMBER
1724	

NOTIFICATION DATE	DELIVERY MODE
12/30/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com
oblonpat@oblon.com
jgardner@oblon.com

Office Action Summary	Application No.	Applicant(s)	
	10/702,646	TOJO ET AL.	
	Examiner	Art Unit	
	BACH T. DINH	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 October 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Summary

1. This is the response to the communication filed on 10/25/2010.

2. Claims 1-9 remain pending in the application.

3. The application is not in condition for allowance.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1-9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 1, 4 and 6 recite the limitation "wherein the mixed molten salt in the electrolyte may be solidified in the hydrogen fluoride gas feed line" (emphasis added), "may be" is indefinite language because it is unclear whether such solidification would occur. Additionally, current application is for preventing the solidification of the electrolyte in the feed line; therefore, it is unclear how such indefinite limitation would further structurally limit the claimed apparatus. Furthermore, the claim and the specification do not indicate the condition in which the electrolyte would solidify.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. The factual inquiries set forth in Graham v. John Deere Co., 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claims 1-9 rejected under 35 U.S.C. 103(a) as being unpatentable over Tojo et al. (WO 01/77412) with equivalent English translation provided by Tojo et al. (US 6,818,105) in view of Saito et al. (US 6,383,300).

The recited limitations "an inert gas substitution means for" of claims 1, 4 and 6 and "a detecting means for" in claim 2 and 7 invoke 35 U.S.C. 112, sixth paragraph. According to the specification, the inert gas substitution means includes the inert gas feeding line 91, the inert gas storage tank 92, the second automatic valve 73, the first automatic valve 74, and an HF feeding interruption detecting means (see specification on page 6). According

to the specification, the first level sensing means 5 and the second level sensing means 6 constitutes the HF feeding interruption detecting means (see specification on page 9).

Addressing claims 1, 4 and 6, Tojo discloses a fluorine gas generator for generating fluorine gas by electrolyzing an electrolyte comprising a hydrogen fluoride containing mixed molten salt (14:22-25), which generator is equipped with:

A hydrogen fluoride gas feed line (figure 3, HF supply line, 10:64), one end of which is connected to a hydrogen fluoride gas supply source (10:53, the hydrogen fluoride gas is continuously fed; therefore, it is inherent that the hydrogen fluoride gas supply line is connected to a hydrogen fluoride gas supply source) and the other end of which is connected to a hydrogen fluoride gas inlet disposed in an electrolyte in the electrolyte bath (in figures 3-4, the HF supply line has one end or the inlet disposed in the electrolyte 3 in the electrolytic bath), for feeding hydrogen fluoride gas into the electrolyte as required by claim 1 and the electrolytic bath as required by claims 4 and 6,

A first automatic valve disposed one the hydrogen fluoride gas feed line (10:60-65, solenoid valve) and capable of being closed on the occasion of interruption of hydrogen fluoride gas feeding (10:65-11:11, the solenoid valve is automatically closed; therefore, the valve is capable of being closed on any occasions including the occasion of interruption of hydrogen fluoride gas feeding), and

An inert gas substitution means for eliminating the hydrogen fluoride gas remaining in at least part of the line on the side downstream from the first automatic valve on the hydrogen fluoride feed line, which part is located downstream from the first

automatic valve and upstream of the hydrogen fluoride gas inlet, and substituting an inert gas thereof on the occasion of interruption of hydrogen fluoride gas feeding (9:38-50, inert gas tank 18, inert gas feed line, valves 62 and 54 of the inert gas supply line and the liquid level probes 8 and 9 constitute the claimed inert gas substitution means; furthermore, when electrolysis is halted, which also means the supply of hydrogen fluoride gas is also halted, the whole system is purged by the inert gas; therefore, the hydrogen fluoride gas remaining in the line downstream from the solenoid valve and upstream from the hydrogen fluoride inlet is also eliminated),

Tojo further disclose the inert gas substitution means comprises an inert gas feed line (figures 3-4).

Tojo is silent regarding the inert gas feed line is directly connected to the hydrogen fluoride feed line.

Saito discloses a heat treatment apparatus; wherein, inert nitrogen gas is used to purge the apparatus by opening valves VB3 and VB3 while closing other valves (13:53-62). Furthermore, the inner nitrogen gas feed lines is connected to the N_2 gas source 36a and connected to the reactive gas feed line at a location downstream from the automatic valve VB1 (figure 1).

Tojo and Saito are analogous arts for they disclose apparatuses that use inert gas for purging. At the time of the invention, one with ordinary skill in the art would have found it obvious to modify the apparatus of Tojo by connecting the inert gas feed line directly to the reactive HF feed line like that of Saito because doing so would allow one to completely purge the apparatus including the HF feed line. Furthermore, one with

ordinary skill in the art would have achieved the predictable result of purging the fluorine generating apparatus when applying the known technique of purging an apparatus by connecting the inert gas feed line to the reactive gas feed line downstream from the automatic valve of Saito to the known fluorine generating apparatus of Tojo. Therefore, the modified apparatus of Tojo with the inert gas feed line connected to the HF feed line on the side downstream from the solenoid valve would effectively purge or eliminate the hydrogen fluoride gas remaining in at least a part of the HF gas feed downstream from the automatic valve and upstream from the HF gas inlet.

Regarding the recited limitation "substituting an inert gas thereof in case of emergency in the fluorine gas generator" of claim 4, Tojo discloses when the electrolysis is halted or in case of emergency, the apparatus is purged (9:43-45). Therefore, the disclosure of Tojo reads on the limitation recited above of instant claim.

Regarding the recited limitation "substituting an inert gas thereof in case the first automatic valve is closed" of claim 6, Tojo discloses the level probes 8 and 9 halt electrolysis when they detect a fluctuation limit (7:12-14) and purge the apparatus with inert gas when the electrolysis is halted (9:37-51). Furthermore, Tojo discloses the liquid level probe (liquid level probe disclosed in 11:2-10) detects fluctuation in the cathode chamber and sends out a signal to close the solenoid valves when such scenario occurs (11:2-11). Therefore, Tojo discloses when a fluctuation occurs, electrolysis is halted, the solenoid valve on the HF feed line is automatically closed and the whole system is purged with inert gas, which meets the above limitation of current claim.

With respect to the limitation "wherein the mixed molten salt in the electrolyte maybe solidified in the hydrogen fluoride feed line", the limitation does not definitively require such condition to exist; therefore, the limitation does not structurally differentiate the claimed apparatus with that disclosed by Tojo in view of Saito.

Addressing claims 2, 5 and 7, Tojo discloses liquid level probes 8 and 9 which constitute the claimed "a detecting means for detecting interruption of feeding of the hydrogen fluoride gas". Tojo further discloses a second automatic valve (solenoid valve 54, figures 3-4) disposed on the inert gas feed line and operated in association with the detecting means to feed the inert gas (7:18-27, the solenoid valve 54 is opened or closed in accordance with the detection results obtained from the level probes 8 and 9). Tojo discloses an inert gas storage tank 18 (figure 1) for storing the inert gas to be fed. Saito discloses the inert gas feed line is provided for feeding the inert gas to the reactive gas feed line on the side downstream from the automatic valve VB1 (figure 1, the inert gas feed line is connected to the reactive gas feed line on the side downstream from the automatic valve VB1); the inert gas feed line further comprises a second automatic valve VB3 and operated in association with the automatic valve VB1 to feed the inert gas into the reactive gas feed line on the side downstream from the automatic valve VB1 (11:52-59, after the completion of the film, VB1 and VB2 are closed; 12:40-49 and 13:53-62, VB3 and VB4 are opened when all the other valves are closed in order to purge the system).

In conjunction with the rejection of claims 1, 4 and 6, the modified apparatus of Tojo with the connectivity of Saito would have the inert gas feed line connected to the HF feed line on the side downstream from the solenoid valve (solenoid valve disclosed in 10:57-65) and the automatic valve 54 of the inert gas feed line operates in association with the level probes 8 and 9 to feed inert gas into the HF feed line on the side downstream from the solenoid valve (7:18-27, the solenoid valve 54 is opened or closed in accordance with the detection results obtained from the level probes 8 and 9; therefore, when the solenoid valve 54 is opened, inert gas would be fed into the HF feed line on the side downstream from the solenoid valve).

Addressing claims 3, 8 and 9, Tojo discloses an inert gas storage tank 18 (figure 1) for storing the inert gas to be fed.

Response to Arguments

9. Applicant's arguments filed 10/25/2009 have been fully considered but they are not persuasive.

Claims 1-9

Firstly, Applicant asserted that "the inert gas lie that connects the inert gas storage tank 92 to the HF gas feed line 24 upstream from the first automatic valve 81...does not correspond to the "inert gas substitution means""; Examiner acknowledges Applicant's reasoning. However, figure 2 of the originally filed specification does not show the inert gas line that connects the tank 92 to a region upstream of the first automatic valve. There

is no discrepancy between Applicant's current remarks to that of the originally filed specification. The discrepancies cited in the previous Office Action are pertained to Applicant's assertion in the remarks filed on 05/19/2010.

Secondly, Applicant argued that "the whole system" of Tojo, including the HF gas feed line, is not purged with inert gas from the existing purge portion 14 when the end of the HF gas feed line is disposed in the electrolyte in the electrolytic bath; Examiner acknowledges Applicant's reasoning; however, the claim **does not** require that the inert gas substitution means to eliminate the hydrogen fluoride gas in the HF feed line when the end of the HF feed line is disposed in the electrolyte in the electrolytic bath. Examiner, however, maintains the position that the end of the HF feed line is purged from the existing purge gas port 14 because Tojo discloses in (9:38-50) that when the fluid in Fig.4 exists when the purge gas is introduced in order to "bring the liquid level of the electrolytic bath in the anode chamber 5 and the liquid level of the electrolytic bath in the cathode chamber 7 back to equal level … (see figure 2) and thereby the electrolysis is restarted". Thus, during the shifting of the liquid level in chamber 5 to equal that in the chamber 7, the end of the HF feed line is exposed to the purge gas, which in effect purging the HF gas in the end of the feed line.

Thirdly, with respect to Applicant's argument that Tojo fails appreciate the negative pressure will drawn electrolyte from the bath into the HF gas feed line, the argument is not persuasive for the following reason. Even though Tojo does not explicitly stated that the electrolyte is drawn into the HF feed line when electrolysis is halted; however, figure 4 shows that when electrolysis is halted, the liquid level in the chamber 5 rises to

immerse the end of the HF feed line; therefore, some of the electrolyte must enter the HF feed line (9:37-50). Furthermore, inert gas is introduced to the gas generation port 4 in order to bring the level of liquid in the chamber 5 to the level as shown in figure 2; therefore, the electrolyte would not get into the HF feed line. Thus, Tojo already shows the rising of the electrolyte to the point of touching the end of the HF feed line is not desired. Moreover, Tojo also acknowledges that HF gas is corrosive (7:62-68).

Fourthly, Applicant argued that the purge gas connection of Saito would not be expected to improve the existing purge gas system of Tojo, the argument is not persuasive because the connection discussed in the modification above would still ensure the liquid level in the chamber 5 equal to that in the chamber 7 as well as purging the end of the HF feed line of corrosive HF gas.

Fifthly, Applicant argued that "connecting an inert gas substitution means to a HF gas feed line disposed in an electrolyte in an electrolytic bath provides an unpredictable improved result", the argument is not persuasive because all such connection does is to lower the level the electrolyte so that electrolyte would not get into the HF feed line, which is done by the purging action of Tojo as discussed above. Thus, the claimed unpredictable result is also accomplished by the connection discussed in the modification; namely, lower the level of electrolyte from the state shown in figure 4 of Tojo to the state shown in figure 2. Furthermore, the proposed connection provides the added bonus of purging the residual corrosive HF gas in the feed line.

Finally, Applicant argued that "there is no rising backflow and the problem to be solved by the invention would not arise in Tojo et al.", the argument is not persuasive because

figure 4 clearly shows when electrolysis is halted, and in the scenario when the purging gas is not introduced, the rising electrolyte would reach the end of the HF feed line before it reaches the purge line 14. Thus, the introduction of purge gas in the gas generation port 14 lowers the level of electrolyte in order to prevent the electrolyte from rising.

For the reasons stated above, Examiner maintains the position that claims 1-9 are obvious over the combined disclosures of Tojo and Saito.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BACH T. DINH whose telephone number is (571)270-5118. The examiner can normally be reached on Monday-Friday EST 7:00 A.M-3:30 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on (571)272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Nam X Nguyen/
Supervisory Patent Examiner, Art Unit 1753

BD
12/22/2010